13455 - The Eccentric Debris Ring Around HD 202628: Signs of Planetary Perturbations

Cycle: 21, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:44:29.0	yes
02	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:44:38.0	yes
03	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:44:46.0	yes
04	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:44:52.0	yes
05	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:44:59.0	yes
06	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:45:06.0	yes
07	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:45:12.0	yes
08	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:45:19.0	yes
09	(1) HD-202628	STIS/CCD	1	18-Jun-2013 21:45:25.0	yes

9 Total Orbits Used

ABSTRACT

Debris disks are the signposts of planetary systems: collisions among asteroidal and cometary parent bodies maintain the observed dust population against losses to radiation pressure, stellar wind, and P-R drag. Disk images establish the size scale of an exoplanetary system. They can reveal central holes, rings, gaps, warps, and asymmetries in the dust distribution that indicate the presence of planetary perturbers. In 2011 we discovered a large debris disk in HST coronagraphic images. HD 202628's disk is an eccentric ring with a sharp inner edge and cleared central zone - only the third such system ever imaged, and with the faintest surface brightness ever for a disk seen in scattered light. Key differences for this object are its larger ring diameter and eccentricity, and the solar-type of the host star. The discovery image represents only two orbits of integration and suffers from low overall signal to noise. We propose a series of deeper imaging observations with the STIS coronagraph over multiple roll angles. Important parameters of the ring to be clarified by the new data are the sharpness of the ring inner edge, its outermost radial extent, and the strength of radial/azimuthal brightness density gradients. From these we can derive constraints on the mass and orbit of the perturbing planet. The outcome of our program will be the best evidence to date for a distant planetary companion to a sun-like star.

OBSERVING DESCRIPTION

We will observe the debris disk around the star HD 202628 with the STIS coronagraph. We will observe the target at 9 different roll orientations of the telescope to improve the diversity needed to perform the iterative PSF subtraction needed to reveal the faint disk. There will be three epochs of observations, each composed of three contiguous orbits. Within each epoch, the three orbits are separated by spacecraft rolls of 15 degrees from each other. The first orbit of each epoch is separated by 45 degrees from that of the previous epoch.

Each orbit begins with an acquisition image using a short 0.5 sec exposure through F25ND3. The target is then moved to the WEDGEA1.8 occulter position. Eight exposures of 282 sec each are taken, for a total of 2256 sec per orbit. The exposure times are chosen to prevent saturation along the edge of the wedge. These are the same exposure times used in our previous observations of this target in program 12291.

Visit

Proposal 13455, Visit 01, implementation Wed Jun 19 01:45:33 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

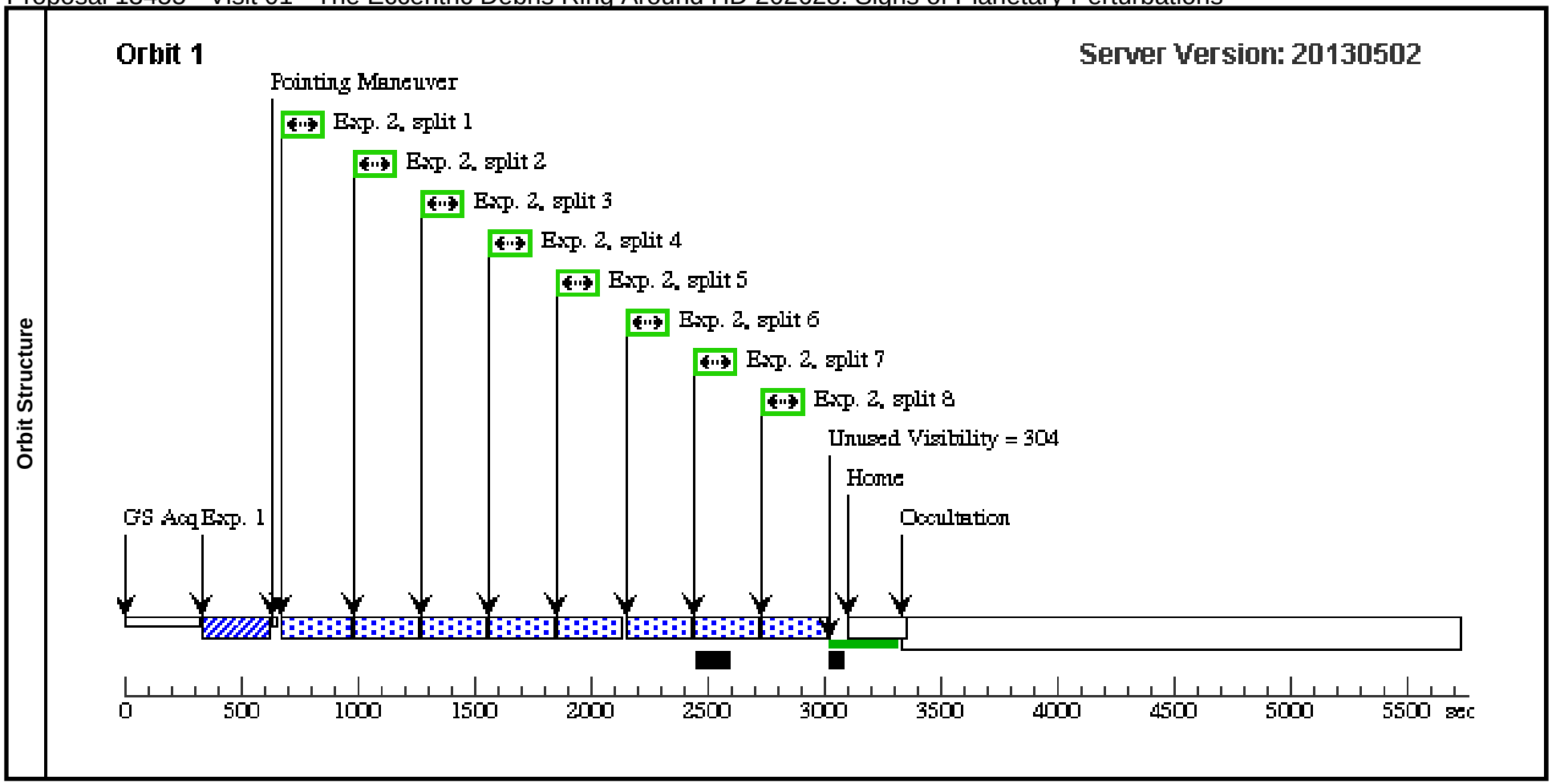
Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***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Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 30d
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13455, Visit 02, implementation Wed Jun 19 01:45:34 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

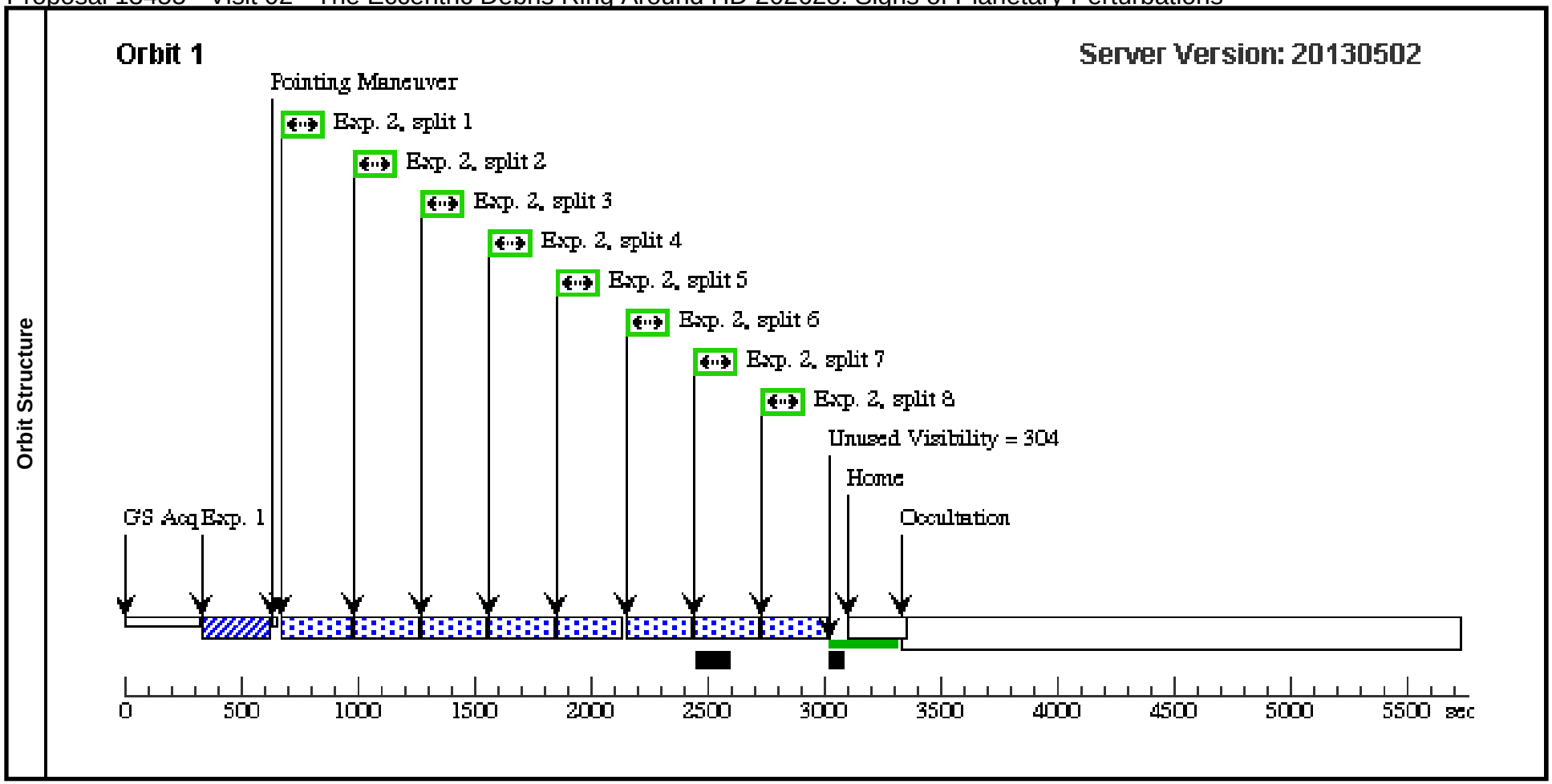
Special Requirements: ORIENT 15D TO 15D FROM 01; AFTER 01 BY 0.8 Orbits TO 1.2 Orbits

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***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Orbit 1
Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 30d
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13455, Visit 03, implementation Wed Jun 19 01:45:36 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

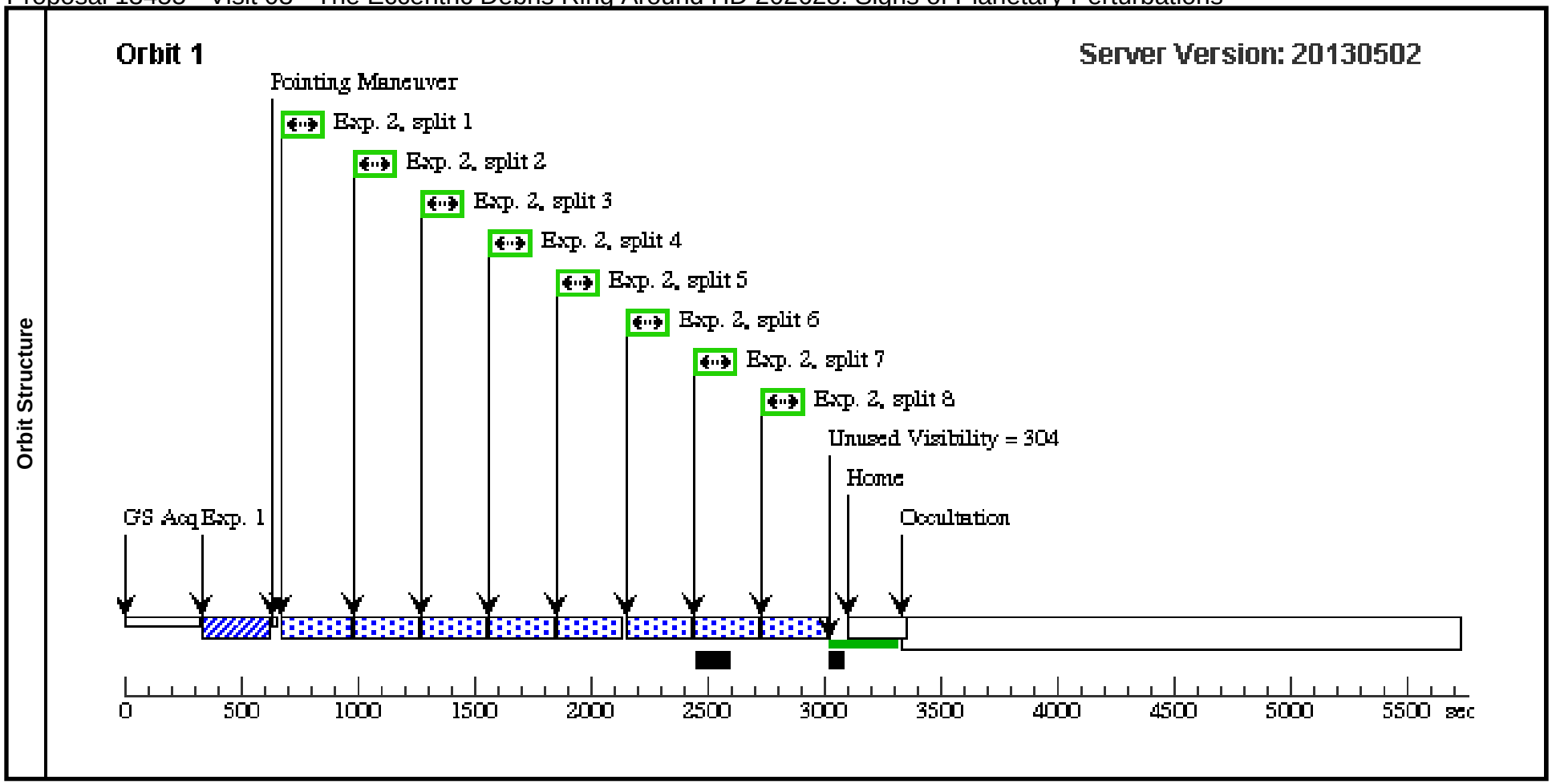
Special Requirements: ORIENT 15D TO 15D FROM 02; AFTER 02 BY 0.8 Orbits TO 1.2 Orbits

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***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Orbit 1
Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 304
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13455, Visit 04, implementation Wed Jun 19 01:45:37 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

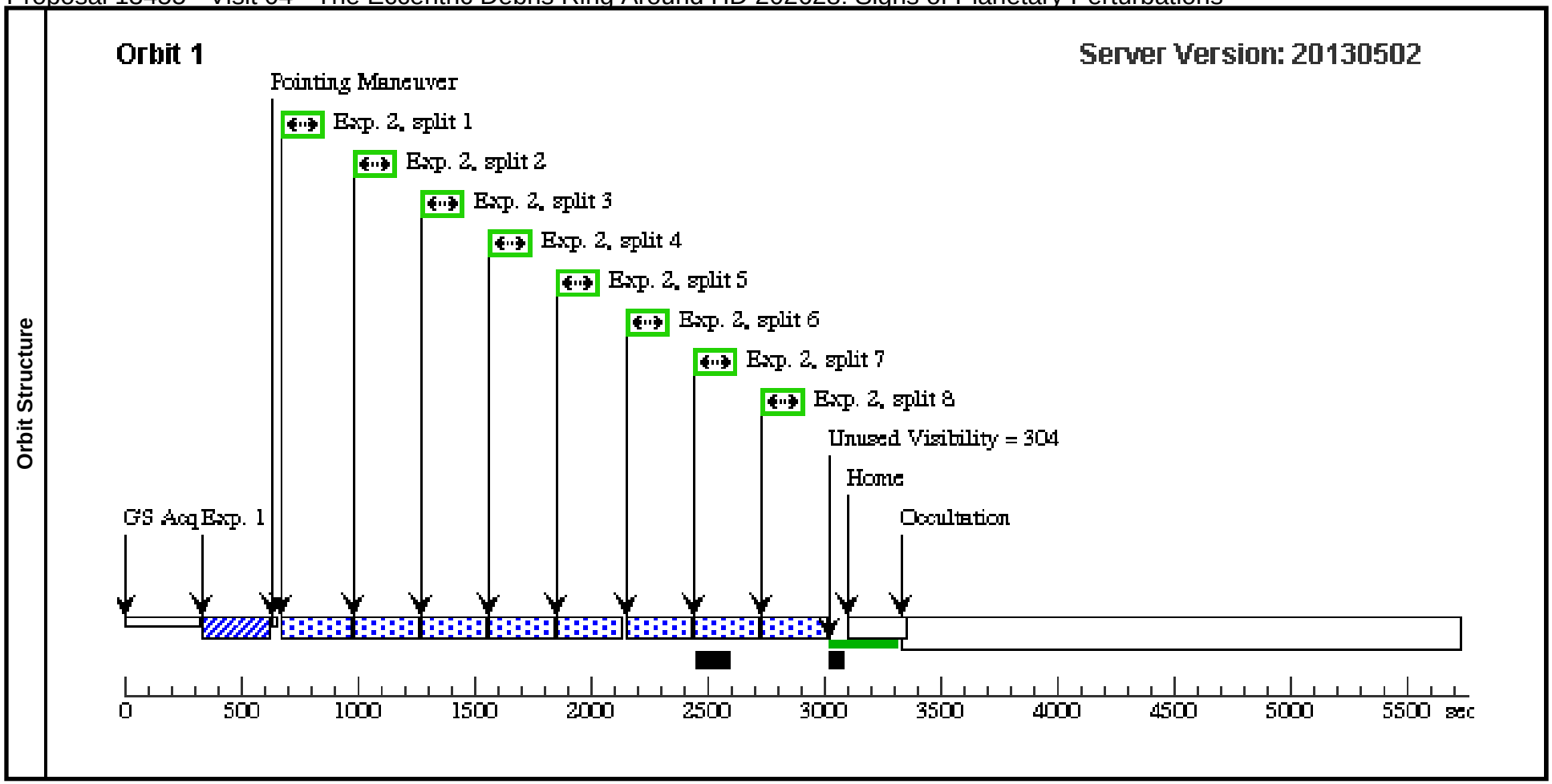
Special Requirements: ORIENT 45D TO 45D FROM 01

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 304
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13455, Visit 05, implementation Wed Jun 19 01:45:38 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

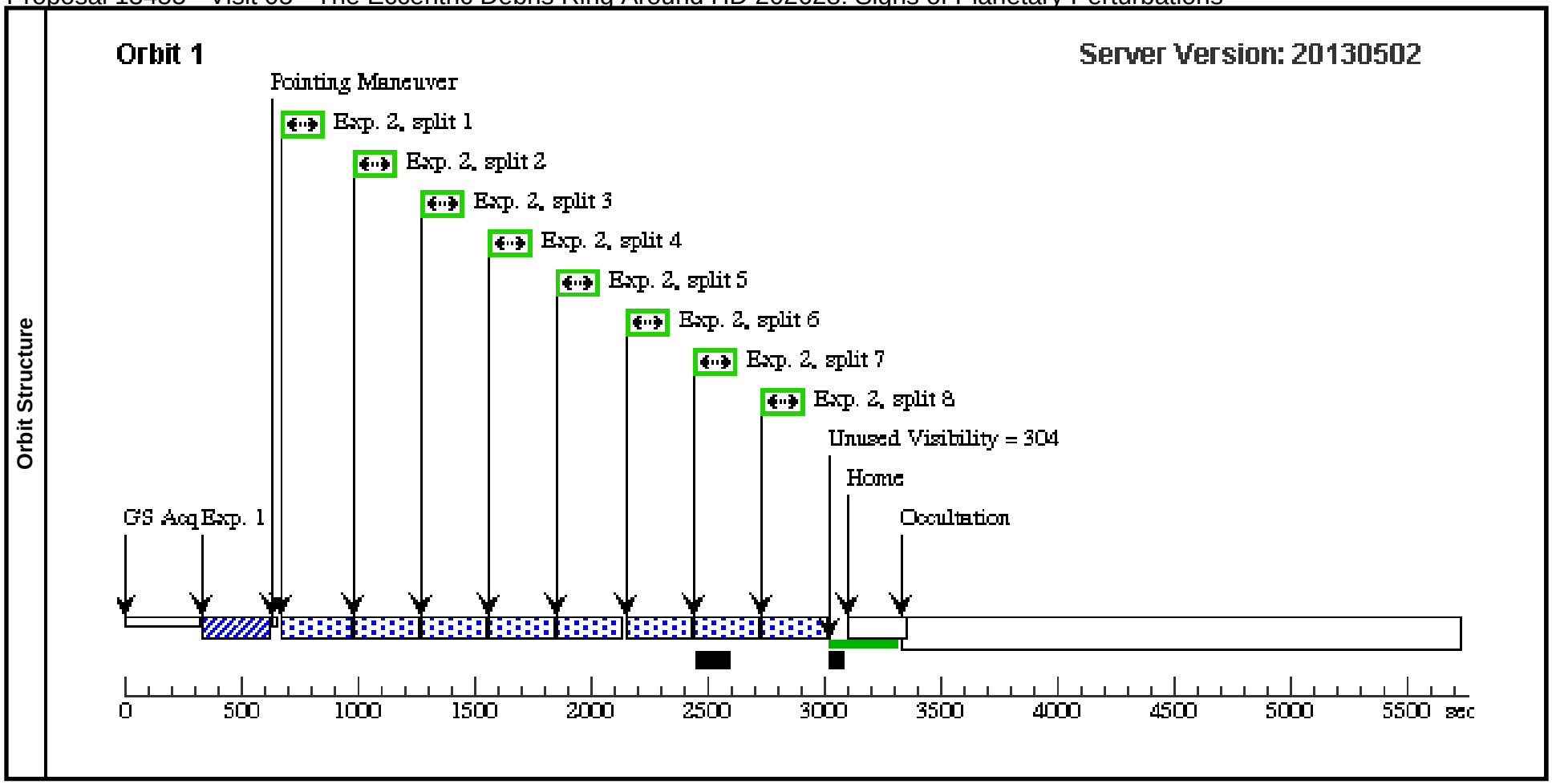
Special Requirements: ORIENT 15D TO 15D FROM 04; AFTER 04 BY 0.8 Orbits TO 1.2 Orbits

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 30d
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13455, Visit 06, implementation Wed Jun 19 01:45:40 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

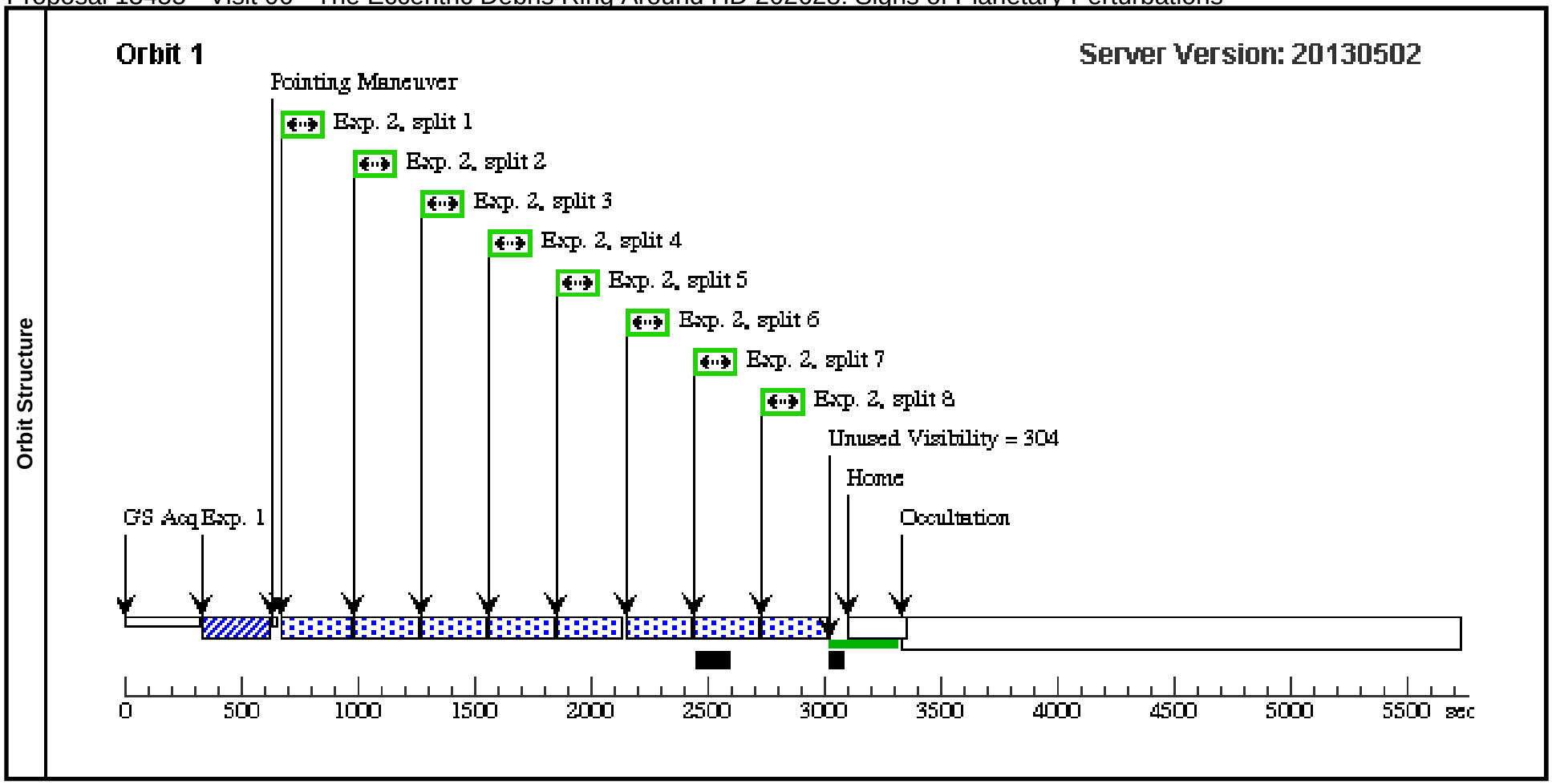
Special Requirements: ORIENT 15D TO 15D FROM 05; AFTER 05 BY 0.8 Orbits TO 1.2 Orbits

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 30d
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13455, Visit 07, implementation Wed Jun 19 01:45:41 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

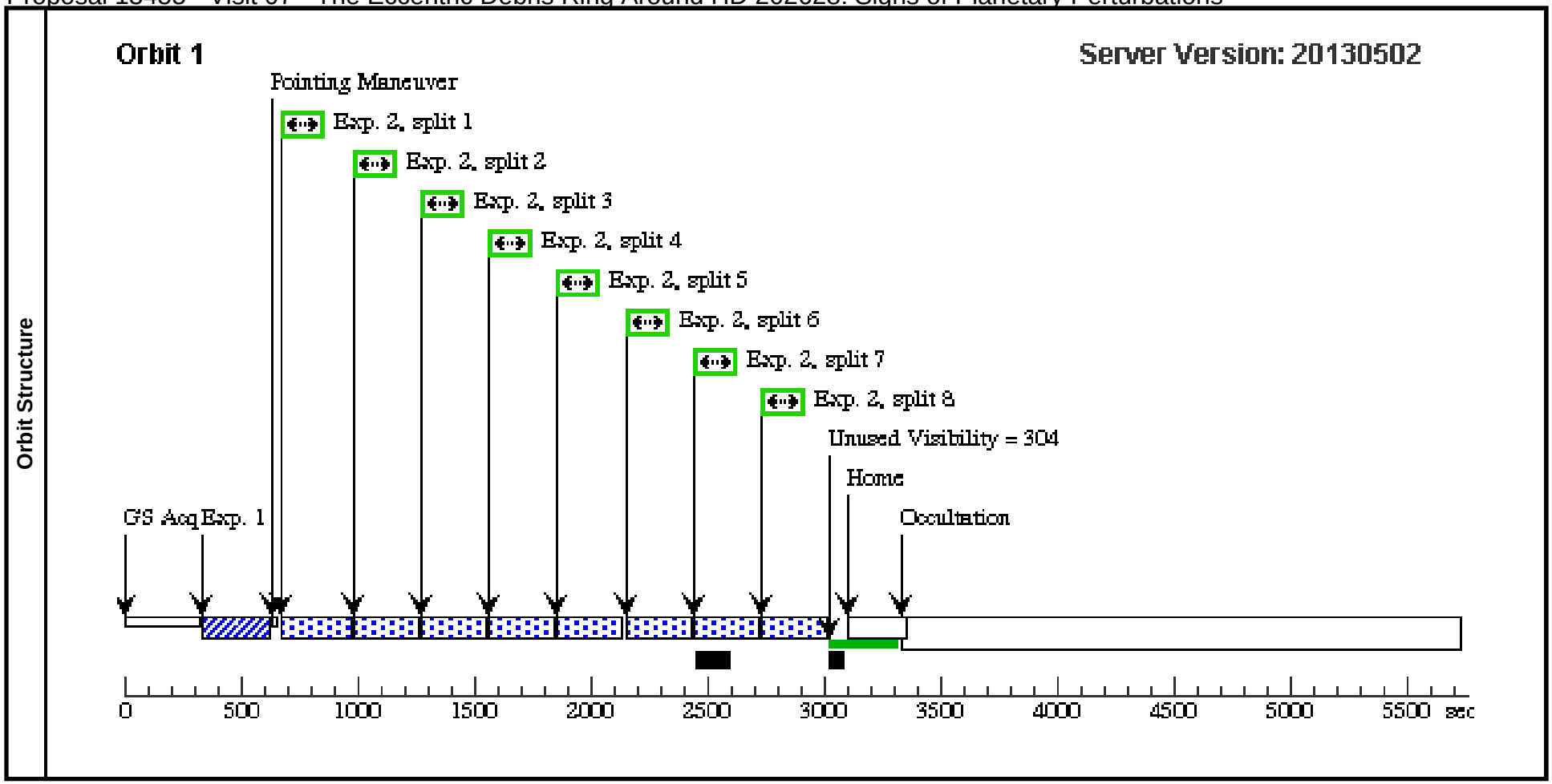
Special Requirements: ORIENT 45D TO 45D FROM 04

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 30d
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13455, Visit 08, implementation Wed Jun 19 01:45:42 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

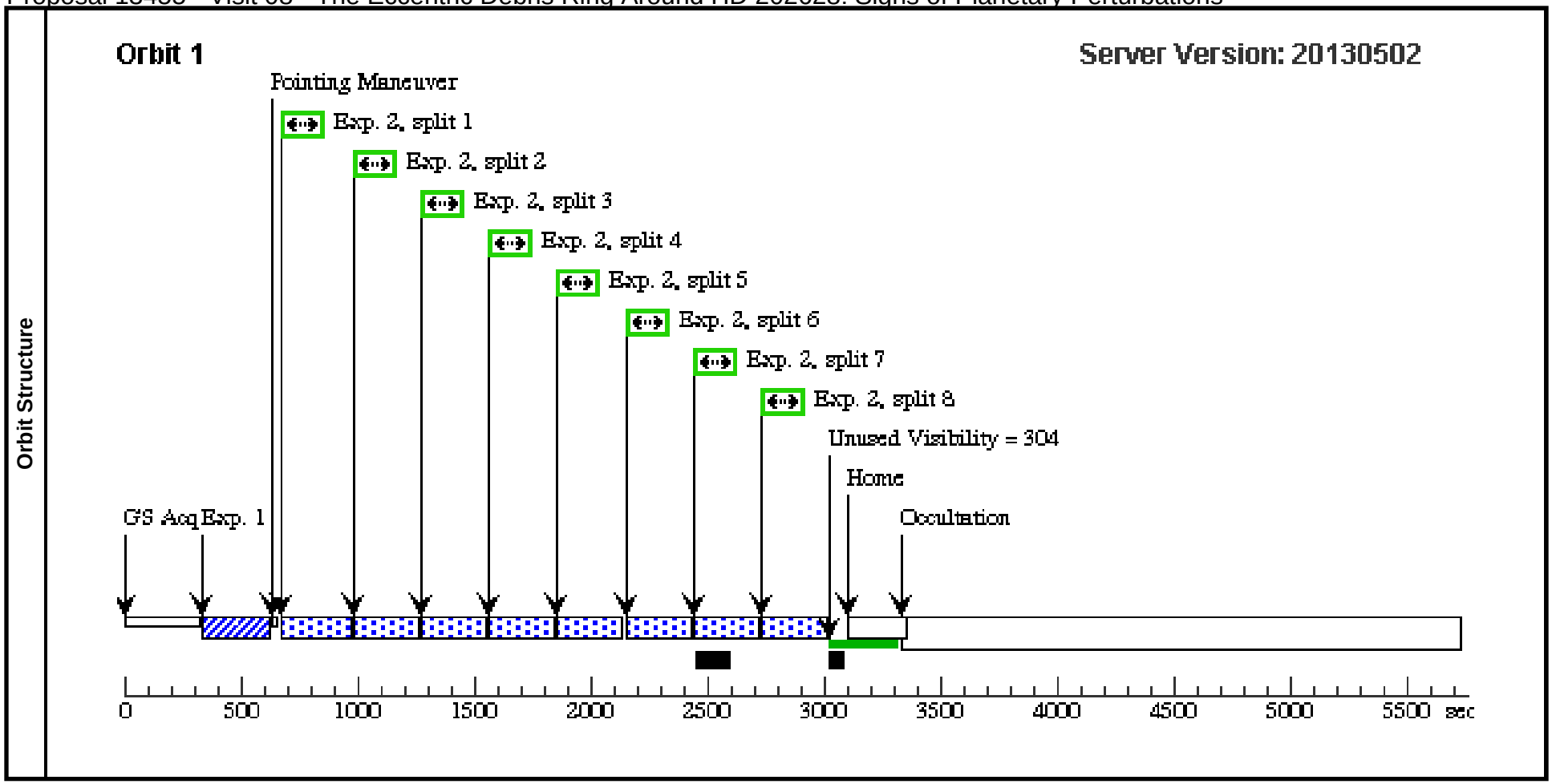
Special Requirements: ORIENT 15D TO 15D FROM 07; AFTER 07 BY 0.8 Orbits TO 1.2 Orbits

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***


Orbit Structure
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Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 304
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13455, Visit 09, implementation Wed Jun 19 01:45:43 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

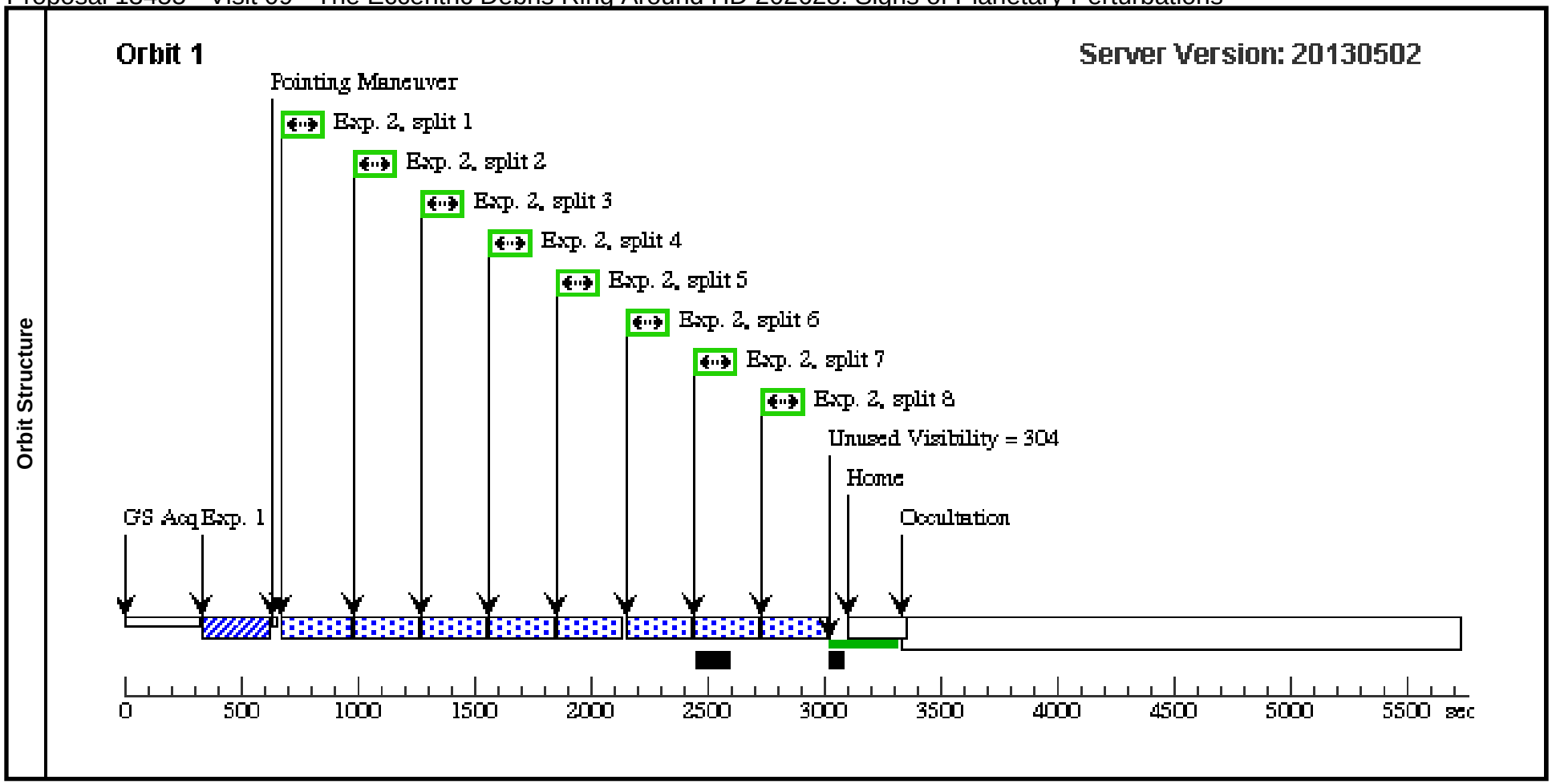
Special Requirements: ORIENT 15D TO 15D FROM 08; AFTER 08 BY 0.8 Orbits TO 1.2 Orbits

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-202628	RA: 21 18 27.2700 (319.6136250d) Dec: -43 20 4.74 (-43.33465d) Equinox: J2000	Proper Motion RA: 0.0232 sec of time/yr Proper Motion Dec: 0.018 arcsec/yr Parallax: 0.04204" Epoch of Position: 2000	V=6.75	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) HD-202628	STIS/CCD, ACQ, F25ND3	MIRROR				0.5 Secs (0.5 Secs)	
								[==>]	***[1]***
2		(1) HD-202628	STIS/CCD, ACCUM, WEDGEA1.8	MIRROR	CR-SPLIT=8			1976 Secs (1976 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]* *[==>(Split 5)]* *[==>(Split 6)]* *[==>(Split 7)]* *[==>(Split 8)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20130502
Pointing Maneuver
Exp. 2, split 1
Exp. 2, split 2
Exp. 2, split 3
Exp. 2, split 4
Exp. 2, split 5
Exp. 2, split 6
Exp. 2, split 7
Exp. 2, split 8
Unused Visibility = 30d
Home
Occultation
GS Acq
Exp. 1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec